

1 **Amendments to the claims :**

This listing of claims will replace all prior versions, and listings, of claims in this application.

**Listing of claims :**

Claim 1 (currently amended): An apparatus for detecting the presence of an analyte in ambient

6 air, the apparatus comprising

a sensing element comprising a surface having a coating of chemoselective material that selectively interacts with the analyte and means to detect the selective interaction of the chemoselective material with the analyte,

a housing that encloses an environment surrounding the sensing element, the housing

11 including an inlet port connected to a sampling pump for taking a gaseous sample from ambient air into the housing under pressure,

device for sealing the environment surrounding the sensing element so that the environment surrounding the sensing element can be isolated from ambient air and evacuated, and

16 an outlet port connected to a vacuum pump for removing the gaseous sample from the environment surrounding the sensing element, wherein the size and orientation of the inlet port are selected so that the gaseous sample is directed to strike the sensing element in a turbulent flow that is substantially perpendicular to the surface having the chemoselective material.

a scrubber for removing the analyte, and

21 a structure for restoring baseline condition of the sensing element.

Claim 2 (currently amended): The apparatus of Claim 1, An apparatus for detecting the presence

- 1       of an analyte in ambient air, the apparatus comprising  
1       a sensing element comprising a surface having a coating of chemoselective material that  
1       selectively interacts with the analyte and means to detect the selective interaction of the  
1       chemoselective material with the analyte.  
6       a housing that encloses an environment surrounding the sensing element, the housing  
6       including an inlet port connected to a sampling pump for taking a gaseous sample from ambient  
6       air into the housing under pressure,  
11      device for sealing the environment surrounding the sensing element so that the  
11      environment surrounding the sensing element can be isolated from ambient air and evacuated,  
11      an outlet port connected to a vacuum pump for removing the gaseous sample from the  
11      environment surrounding the sensing element, wherein the size and orientation of the inlet port  
11      are selected so that the gaseous sample is directed to strike the sensing element in a turbulent  
11      flow that is substantially perpendicular to the surface having the chemoselective material,  
11      wherein the inlet port includes a tubular passageway having a direction that is substantially  
11      perpendicular to the surface of the sensing element and terminates in an opening that is spaced  
16      apart from the surface of the sensing element, so that a gaseous sample passing through the inlet  
16      port is propelled onto the surface of the sensing element in a turbulent flow; wherein the outlet  
16      port comprises an annular cavity; and wherein the chemoselective material is a chemoselective  
16      polymer.
- Claim 3 (original): An apparatus for detecting the presence of at least one analyte in ambient air,  
21      the apparatus comprising  
                (a) at least one sensing element comprising a surface having at least one coating of

- 1 chemoselective material that selectively interacts with the at least one analyte and means to  
detect the selective interaction of the at least one chemoselective material with the at least one  
analyte,
- 6 a housing that encloses an environment surrounding the at least one sensing element, the  
housing including an inlet port connected to a sampling pump for taking a gaseous sample from  
the ambient air into the housing under pressure, means for sealing the environment surrounding the  
sensing element so that the environment surrounding the at least one sensing element can be  
isolated from ambient air and evacuated, and an outlet port connected to a vacuum pump for  
removing the gaseous sample from the environment surrounding the at least one sensing element,  
wherein the size and orientation of the inlet port are selected so that the gaseous sample is  
11 directed to strike each at least one sensing element in a turbulent flow that is substantially  
perpendicular to the surface of the sensing element having the chemoselective material, and
- 16 (b) a fast signal kinetic chemical detector,  
wherein the at least one sensing element of (a) and the ion mobility spectrometer of (b)  
both produce a signal response and wherein the apparatus includes means to merge and  
simultaneously analyze the signal response of the at least one sensing element of (a) and the  
detector of (b).
- Claim 4 (currently amended): An apparatus for detecting presence of an analyte in ambient air  
which does not require a warm-up period comprising  
21 a first valve for allowing entry/blocking of the ambient air that may contain the analyte,  
a sensing element having a chemoselective material on its surface for selectively  
interacting with the analyte,

1           a sensor for detecting the interaction of said sensing element with the analyte,  
a housing that encloses environment surrounding said sensing element,  
an inlet port associated with said housing for passing the sample against said sensing  
element, the size and orientation of said inlet port are selected so that the air is directed to strike  
said sensing element in a turbulent flow that is substantially perpendicular to said sensing  
element,  
6           element,

              a device for sealing the environment surrounding said sensing element so that the  
environment surrounding said sensing element can be isolated from the air and evacuated,  
              an outlet port for passing the air from the environment surrounding said sensing element,

and

11           a pump connected to said outlet port for drawing the air in against the sensing element,  
a scrubber for removing the analyte, and  
a structure for restoring baseline condition of the sensing element, wherein said sensing  
element is about 0.3" x 0.05", said sensing element is disposed about 0.1" from said inlet port,  
said inlet port is about 0.4" in diameter, and the air is directed substantially perpendicularly at  
16           said sensing element at a flow rate sufficient to obtain turbulent flow.

Claims 5 (currently amended): The apparatus of claim 4 An apparatus for detecting presence of  
an analyte in ambient air which does not require a warm-up period comprising  
a first valve for allowing entry/blocking of the ambient air that may contain the analyte,  
a sensing element having a chemoselective material on its surface for selectively  
21           interacting with the analyte,

a sensor for detecting the interaction of said sensing element with the analyte,

- 1       a housing that encloses environment surrounding said sensing element,  
          an inlet port associated with said housing for passing the sample against said sensing  
          element, the size and orientation of said inlet port are selected so that the air is directed to strike  
          said sensing element in a turbulent flow that is substantially perpendicular to said sensing  
          element,
- 6       a device for sealing the environment surrounding said sensing element so that the  
          environment surrounding said sensing element can be isolated from the air and evacuated,  
          an outlet port for passing the air from the environment surrounding said sensing element,  
          and  
          a pump connected to said outlet port for drawing the air in against the sensing element.,  
11      wherein said first valve is a 3-way valve; wherein said inlet port is tubular and is disposed  
          substantially perpendicularly to said sensing element; and said pump is a vacuum pump.  
Claim 6 (currently amended): The apparatus of claim 4 An apparatus for detecting presence of  
          an analyte in ambient air which does not require a warm-up period comprising  
          a first valve for allowing entry/blocking of the ambient air that may contain the analyte,  
16      a sensing element having a chemoselective material on its surface for selectively  
          interacting with the analyte,  
          a sensor for detecting the interaction of said sensing element with the analyte,  
          a housing that encloses environment surrounding said sensing element,  
          an inlet port associated with said housing for passing the sample against said sensing  
21      element, the size and orientation of said inlet port are selected so that the air is directed to strike  
          said sensing element in a turbulent flow that is substantially perpendicular to said sensing

1       element,

a device for sealing the environment surrounding said sensing element so that the environment surrounding said sensing element can be isolated from the air and evacuated,  
      an outlet port for passing the air from the environment surrounding said sensing element,  
      and

6       a pump connected to said outlet port for drawing the air in against the sensing element :-  
          a scrubber in concert with said pump for removing the analyte from the air to yield a scrubbed air; and a third valve connected to said scrubber providing the scrubbed air to said sensing element.

Claim 7 (currently amended): ~~The apparatus of claim 4 including~~ An apparatus for detecting  
11 presence of an analyte in ambient air which does not require a warm-up period comprising  
      a first valve for allowing entry/blocking of the ambient air that may contain the analyte,  
      a sensing element having a chemoselective material on its surface for selectively interacting with the analyte,

16       a sensor for detecting the interaction of said sensing element with the analyte,  
      a housing that encloses environment surrounding said sensing element,  
      an inlet port associated with said housing for passing the sample against said sensing element, the size and orientation of said inlet port are selected so that the air is directed to strike said sensing element in a turbulent flow that is substantially perpendicular to said sensing element,

21       a device for sealing the environment surrounding said sensing element so that the environment surrounding said sensing element can be isolated from the air and evacuated,

1           an outlet port for passing the air from the environment surrounding said sensing element,  
and

      a pump connected to said outlet port for drawing the air in against the sensing element - ,  
      and a fourth valve connected between said pump and said scrubber.

Claim 8 (original): The apparatus of claim 7 including a second valve between said third and  
6           said first valves.

Claim 9 (original): The apparatus of claim 8 wherein said first valve is a 3-way valve, said  
second valve is a 2-way valve, said third valve is a 2-way valve, said fourth valve is a 3-way  
valve, and wherein size of said pump is such as to produce flow rate of about 7 l/min.

11          Claim 10 (original): The apparatus of claim 8 wherein said inlet port is tubular and is disposed  
                  substantially perpendicularly to said sensing element, and said pump is a vacuum pump.

Claim 11 (original): The apparatus of claim 10 wherein said sensing element is about 0.3" x  
0.05" , said sensing element is disposed about 0.1" from said inlet port , said inlet port is about  
0.4" in diameter, and the air is directed substantially perpendicularly at said sensing element at  
a flow rate sufficient to obtain turbulent flow.

16          Claim 12 (withdrawn): A method of monitoring ambient air to detect the presence of an analyte,  
                  the method comprising the steps of

                  (a) providing an apparatus that comprises a sensing element comprising a surface having  
                    a coating of chemoselective material that selectively interacts with the analyte and means to  
                    detect the selective interaction of the chemoselective material with the analyte, a housing that  
21            encloses an environment surrounding the sensing element, the housing including an inlet port  
                  connected to a sampling pump for removing a gaseous sample from ambient air and taking the

1 gaseous sample into the housing under pressure, wherein the size and orientation of the inlet port  
are selected so that the gaseous sample is directed to the sensing element in a turbulent flow that  
is substantially perpendicular to the surface having the chemoselective material coating, an outlet  
port for removing the gaseous sample from the environment surrounding the sensing element and  
means for sealing the environment surrounding the sensing element so that the environment  
surrounding the sensing element can be isolated from ambient air and evacuated,  
6 (b) sealing the environment surrounding the sensing element from ambient air and  
evacuating the environment, so that a baseline for the sensing element is established,  
11 (c) removing a gaseous sample from ambient air and taking the gaseous sample into the  
housing under initially reduced pressure so that the gaseous sample is directed to strike the  
sensing element in a turbulent flow that is substantially perpendicular to the surface having the  
chemoselective material coating, whereby molecules of the analyte, if present in the gaseous  
sample, interact with the chemoselective material and wherein any such interaction is detected,  
and whereby non-analyte molecules in the gaseous sample are propelled by the turbulent flow  
towards the outlet port, and (d) repeating steps (b) - (c) to cyclically monitor the ambient gas  
16 for the presence of the analyte and restore the sensing element to its baseline.

Claim 13 (withdrawn): A method of monitoring ambient air to detect presence of an analyte  
therein, the method comprises the steps of

(a) drawing in the air that may contain an analyte,  
21 (b) projecting the air at a sensing element in a turbulent flow by flowing the air at the  
sensing element, the sensing element having on its surface a chemoselective material that  
selectively interacts with the analyte, and

1 (c) detecting the interaction of the analyte with the sensing element.

**Claim 14 (withdrawn):** The method of claim 13 including the step of restoring baseline condition of the sensing element in less than about 2 seconds by flowing a scrubbed gas into the sensing element.

**Claim 15 (withdrawn):** The method of claim 13 including the step of restoring baseline

6 condition of the sensing element by flowing ambient air into the sensing element.

**Claim 16 (withdrawn):** The method of claims 13 including the steps of passing the air through a scrubber, after the air has been projected against the sensing element, where the analyte is removed from the air and then cleaning the sensing element with the scrubbed air to reset the baseline condition thereof.

11 Claim 17 (withdrawn): The method of claim 16 including the step of passing the scrubbed air to  
a valve where the scrubbed air is blocked/allowed to proceed.

**Claim 18 (withdrawn):** The method of claim 17 including the steps of separately passing/blocking flow of the air to the sensing element and separately passing/blocking flow of the scrubbed air to the sensing element in order to restore baseline condition of the sensing element.

16 element.

Claim 19 (withdrawn): The method of monitoring ambient air to detect presence of an analyte, the method comprising the steps of

(a) drawing air from ambient air that may contain an analyte against a sensing element coated with a chemoselective material which selectively interacts with the analyte in a turbulent

flow to increase effectiveness of the chemoselective material,

(b) scrubbing the air of analyte, the air coming from the sensing element,

- 1                     (c) cleaning the sensing element by flowing the scrubbed air thereover in order to restore  
the sensing element to its baseline condition,
- (d) drawing unscrubbed air from the ambient air, and
- (e) detecting the selective interaction of the sensing element with any analyte that may be  
in the air.
- 6     Claim 20 (withdrawn): The method of claim 19 including the steps of sealing the environment  
surrounding the sensing element when the sensing element is interacting with the unscrubbed air  
and sealing the environment around the sensing element when the sensing element is cleaned with  
scrubbed air.
- Claim 21 (withdrawn): The method of claim 20 including the step of restoring baseline  
11 condition of the sensing element in less than about 2 seconds by flowing scrubbed gas onto the  
sensing element.
- Claim 22 (withdrawn): The method of claim 21 including the step of sensing a different analyte  
which has different response and different recovery from the analyte already sensed.
- 16    Claim 23 (withdrawn): The method of claim 21 including the step of differentiating between  
analytes sensed with a sensor coated with one chemoselective material.
- Claim 24 (withdrawn): The method of claim 21 wherein temperature and/or humidity effects  
on sensing ambient air to detect presence of an analyte is eliminated.
- Claim 25 (withdrawn): The method of claim 21 wherein a single chemoselective material on  
the sensing element senses multiple analytes.

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